IN THE CLAIMS:

We claim

1. A method comprising:

modeling a circadian rhythm,

calculating a cognitive level of a person based on the person's sleep/wake data,

calculating a predicted cognitive performance based on said circadian rhythm and said cognitive level.

2. A system for performing the method according to claim 1, said system comprising:

at least one input device for entering sleep/wake data,

a microprocessor that performs the method of claim 1, and

a display to show the predicted cognitive performance.

3. A computer-readable medium having computer-executable instructions for performing the method recited in claim 1.

4. A method of evaluating the effectiveness of a person to perform a task based on previous or predicted sleep pattern comprising the steps of:

modeling circadian oscillators for the person;

calculating the amount of effective sleep in a sleep reservoir for the person based on the person's sleep and activity pattern; and

calculating an effectiveness of the person to perform said task based on said oscillators and said sleep reservoir.

5. A method as recited in claim 4, comprising the further step of calculating a sleep debt.

6. A method as recited in claim 5, further comprising the step of calculating sleep intensity based on said sleep debt.

7. A method as recited in claim 6, wherein said step of modeling circadian oscillators further comprises determining sleep propensity and performance rhythm.

8. A method as recited in claim 7, wherein said step of modeling circadian oscillators is done according to the equation:

$m(t) = F + (A_1 * \cos(2\Pi(t - V_1) / P_1) + A_2 * \cos(2\Pi(t - V_2) / P_2))$

where F is an offset, t is the time of day, P_1 and P_2 are periods of two sinusoids, V_1 and V_2 are the peak times of day in time units or epochs past midnight, and A_1 and A_2 are amplitudes of their respective cosine curves.

9. A method as recited in claim 5, wherein said step of determining the person's sleep debt is based on said amount of effective sleep in the sleep reservoir.

10. A method as recited in claim 4, comprising the further step of determining if the person's sleep experienced any fragmentation.

11. A method as recited in claim 10, wherein said step of determining if the person's sleep experienced any fragmentation is based on frequency of awakenings from sleep.

12. A method as recited in claim 4, comprising the further step of determining sleep inertia for the person.

13. A method as recited in claim 12, wherein said effectiveness of the person to perform said task is calculated based upon said circadian oscillators, said amount of effective sleep in said sleep reservoir, and said sleep inertia.

14. A method of evaluating the effectiveness of a person to perform a task based on sleep patterns comprising the steps of:

modeling circadian oscillators for the person;

calculating the amount of effective sleep in a sleep reservoir for the person;

determining if the person's sleep experienced any fragmentation; and

calculating the effectiveness of the person to perform said task.

15. A method as recited in claim 14, comprising the further step of calculating a sleep intensity to determine a rate of sleep accumulation.

16. A method as recited in claim 14, comprising the further step of determining sleep inertia for the person, and

wherein said effectiveness of the person to perform said task is calculated based upon said circadian oscillators, said amount of effective sleep in said sleep reservoir, and said sleep inertia.

17. A system of evaluating the effectiveness of a person to perform a task based on sleep pattern comprising:

at least one input device for entering sleep/wake data;

a microprocessor that models circadian oscillators, calculates an amount of effective sleep in a sleep reservoir based on a sleep and activity pattern, and calculates an effectiveness to perform a task based on said oscillators and said sleep reservoir, based on said sleep/wake data; and

a display to show said effectiveness results.

18. A system as recited in claim 17, wherein said at least one input device provides data for an individual person.

19. A computer readable medium having computer-executable instructions for evaluating the effectiveness of a person to perform a task based on sleep pattern comprising the steps of:

modeling circadian oscillators for a person;

calculating the amount of effective sleep in a sleep reservoir for the person based on their sleep and activity pattern; and

calculating an effectiveness of the person to perform said task based on said oscillators and said sleep reservoir.

20. A computer readable medium having computer-executable instructions for evaluating the effectiveness of a person to perform a task based on sleep pattern, as recited in claim 19, comprising the further step of determining if the person's sleep experienced any fragmentation.

21. A computer-readable medium having computer-executable instructions for evaluating the effectiveness of a person to perform a task based on sleep pattern comprising the steps of:

modeling circadian oscillators for the person;

calculating the amount of effective sleep in a sleep reservoir for the person;

determining if the person's sleep experienced any fragmentation; and

calculating the effectiveness of the person to perform said task.

22. A computer-readable medium having computer-executable instructions for evaluating the effectiveness of a person to perform a task based on sleep pattern, as recited in claim 21, comprising the further step of determining sleep inertia for the person.

23. In a computer system having an interface including a display and a user interface selection device, a method of evaluating the effectiveness of a person to perform a task based on a sleep pattern using the interface, comprising the steps of:

(i) receiving sleep pattern data for an individual;

(ii) displaying a schedule based on the sleep schedule data; and

(iii) calculating and displaying a measure of task performance, wherein the measure is based at least in part on the received sleep pattern data.

24. The method of claim 23, further comprising steps of:

(iv) entering a parameter affecting the displayed schedule; and

(v) displaying a second schedule for the individual, wherein the second schedule includes a recalculated measure of task performance responsive to the entered parameter.

25. The method of claim 24, wherein step (iv) comprises modifying an existing parameter.

26. The method of claim 24, wherein step (iv) comprises editing a sleep and work interval.

27. The method of claim 23, wherein step (iii) comprises the steps of:

(a) modeling circadian oscillators for the individual;

(b) calculating the amount of effective sleep in a sleep reservoir for the individual based on the individual's sleep and activity pattern; and

(c) calculating the measure of task performance based on the oscillators and the sleep reservoir.

28. The method of claim 23, further comprising the step of storing the measure of task performance to a file.

29. The method of claim 23, wherein step (i) comprises receiving sleep pattern data as input from a user of the computer system.

30. A computer readable medium storing computer readable instructions that, when executed by a computer system, perform a method of evaluating the effectiveness of a person to perform a task based on a sleep pattern using the interface, comprising the steps of:

(i) receiving sleep pattern data for an individual;

(ii) displaying a schedule based on the sleep schedule data; and

(iii) calculating and displaying a measure of task performance, wherein the measure is based at least in part on the received sleep pattern data.

31. The computer readable medium of claim 30, wherein the computer readable instructions further cause a computer system to perform method steps comprising:

(iv) entering a parameter affecting the displayed schedule; and

(v) displaying a second schedule for the individual, wherein the second schedule includes a recalculated measure of task performance responsive to the entered parameter.

32. The computer readable medium of claim 30, wherein step (iv) comprises modifying an existing parameter.

33. The computer readable medium of claim 30, wherein step (iv) comprises editing a sleep and work interval.

34. The computer readable medium of claim 30, wherein step (iii) comprises:

(a) modeling circadian oscillators for the individual;

(b) calculating the amount of effective sleep in a sleep reservoir for the individual based on the individual's sleep and activity pattern; and

(c) calculating the measure of task performance based on the oscillators and the sleep reservoir.

35. A method for providing a cognitive performance level comprising:

receiving a data series representing at least one wake state and at least one sleep state,

selecting a function based on the data series,

determining a cognitive performance capacity using the selected function,

modulating the cognitive performance capacity with a time of day value, and

providing the modulated value.

36. The method according to claim 35, wherein the selecting the function based on the data series includes selecting the function from a group consisting of a wake function, a sleep function, and a sleep inertia function,

the wake function is expressed as follows

$$w(t) = C_{t-1} - k_w$$

where k_w is a positive function,

the sleep function is expressed as follows

$$s(t) = C_{t-1} + (100 - C_{t-1}) / k_S$$

where k_S is a time constant, and

the sleep inertia function is expressed as follows

$$i(t) = C_{SW} * [0 .75 + 0.025 (t - t_{LS}) - (0.025 (t - t_{LS}))^2]$$

where t_{LS} is time when the last sleep state occurred and C_{SW} is the cognitive level at the last sleep state.